**Supplemental Material**

# Biomarkers of Chlorpyrifos Exposure and Effect in Egyptian Cotton Field Workers

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**Supplemental Material, Table 1. Occupational survey of the study population during the summer of 2008**

| **Mean ± SD (Range)** | **Applicator (N=14)** | **Technician (N=12)** | **Engineer (N=12)** |
|---|---|---|---|
| How many years of school have you completed? | 11.29 ± 2.13 (7-15) | 12.33 ± 1.16 (12-16) | 12.27 ± .647 (12-14) |
| How many years have you been at your current job? | 5.29 ± 6.26* (.08-23) | 17.42 ± 4.72 (13-27) | 20.0 ± 6.57 (12-32) |
| How many years have you mixed or applied pesticides at home? | 5.21 ± 6.46 (0-25) | 6.17 ± 5.51 (0-20) | 4.27 ± 4.29 (0-10) |
| **N responding "yes" (%responders)** | | | |
| Do you shower after applying pesticides at work? | 14 (100%) | 10 (90.9%) | 12 (100%) |
| Do you wash your hands right after applying pesticides? | 10 (71.4%) | 9 (81.8%) | 12 (100%) |
| Do you wash your hands before eating lunch? | 6 (42.9%) | 4 (33.3%) | 6 (54.5%) |
| **N responding "never" (%responders)** | | | |
| Do you wear short pants in the fields? | 9 (100%) | 8 (100%) | 8 (100%) |
| Do you wear long sleeves in the fields? | 4 (28.6%) | 1 (9.1%) | 0 (0%) |
| Do you walk in the fields with bare feet? | 3 (21.4%) | 8 (80%) | 7 (77.8%) |
| Do you wear a bandana over your face in the fields? | 11 (84.6%) | 9 (90%) | 8 (80%) |
| Do you wear waterproof gloves when mixing/handling pesticides? | 10 (76.9%) | 6 (75%) | 3 (37.5%) |
| Do you wear a mask over nose and mouth when mixing/handling pesticides? | 9 (64.3%) | 3 (27.2%) | 1 (8.3%) |

*Signifies a $p<0.0001$ between applicators and the two other job categories determined by one-way ANOVA with Tukey's pot-hoc analysis.

**Supplemental Material, Table 2. Comparison of the current study to previous studies focused on identifying chlorpyrifos exposure to humans through the use of urinary TCPy concentrations**

| | Hines & Deddens (2001) | Alexander et al. (2006) | CDC (2009) | Garabrant (2009) | Farahat et al. (2010) | Current Study |
|---|---|---|---|---|---|---|
| **Study Descriptives** | | | | | | |
| Study Location | N. Carolina, USA | Minnesota & S. Carolina, USA | United States of America | Michigan, USA | Menoufia, Egypt | Menoufia, Egypt |
| Study Size | N = 39 | N = 34 | N = 1113 | N ≈ 50 | N = 18 | N = 37 |
| Age | 18 - 54 | 40 - 54 | 20 - 59 | 41[a] | 17 - 59 | 15 - 57 |
| Gender | Male | Male | Male/ Female | Male/ Female | Male | Male |
| **Exposure Descriptives** | | | | | | |
| Source of Exposure | CPF application for termite control | CPF application to farmland | Background exposure in the USA | Manufacturing CPF | CPF application to cotton plants | CPF application to cotton plants |
| Route of Exposure | Dermal/ Inhalation | Dermal | Oral/ Dermal/ Inhalation | N/A | Dermal | Dermal |
| CPF formulation | Liquid | Liquid/ Granular | N/A | N/A | Liquid | Liquid |
| **CPF Exposure & Effect Biomarkers** | | | | | | |
| Urinary TCPy Range (µg/g creatinine) | 9.4 – 1,960 | 2.0 - 121 | 1.6 - 7.4[b] | 5 – 7,404[c] | 6.25 – 2,471[d] | 4.1 – 30.1X10$^3$ |
| BuChE Inhibition Observed Following CPF Exposure | N/D | N/D | N/D | Yes | N/D | Yes |
| AChE Inhibition Observed Following CPF Exposure | N/D | N/D | N/D | No | N/D | Yes |

N/A - Not available

N/D - Not determined

[a] Mean

[b] Range in 50th - 95th percentile urinary TCPy concentrations

[c] Range in 5th - 95th percentile urinary TCPy concentrations

[d] Range in average values reported for four distinct exposure categories

[e] Range in single day urinary TCPy excretion concentrations from individual workers

**Supplemental Material References**

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Garabrant DH, Aylward LL, Berent S, Chen Q, Timchalk C, Burns CJ, et al. 2009. Cholinesterase inhibition in chlorpyrifos workers: Characterization of biomarkers of exposure and response in relation to urinary TCPy. J Expo Sci Environ Epidemiol 19(7):634-642.

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